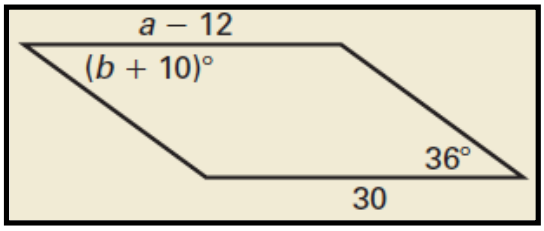
Bellwork
01/30/2012

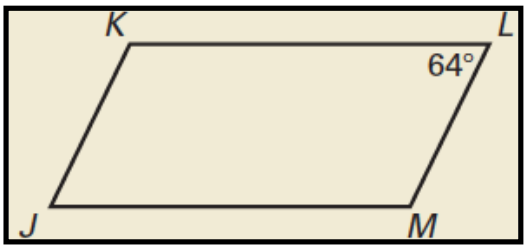
1. Find the values of *a* and *b* in the parallelogram.



$a-12=30$ $b+10=36$

$a=42$ $b=26$

2. Find the measure of ∠K in the parallelogram.



$m\angle K+64=180$

$m\angle K=116°$

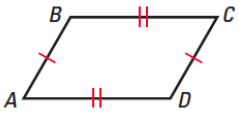
Geometry
8.3 Show that a Quadrilateral is a Parallelogram
Standard(s): 6, 8

Vocabulary:

THEOREMS *For Your Notebook*

THEOREM 8.7

If both pairs of opposite sides of a quadrilateral are congruent, then the quadrilateral is a parallelogram.

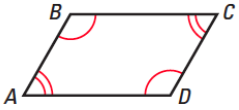


If $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{AD}$, then $ABCD$ is a parallelogram.

Proof: below

THEOREM 8.8

If both pairs of opposite angles of a quadrilateral are congruent, then the quadrilateral is a parallelogram.



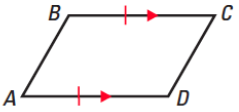
If $\angle A \cong \angle C$ and $\angle B \cong \angle D$, then $ABCD$ is a parallelogram.

Proof: Ex. 38, p. 529

THEOREMS *For Your Notebook*

THEOREM 8.9

If one pair of opposite sides of a quadrilateral are congruent and parallel, then the quadrilateral is a parallelogram.

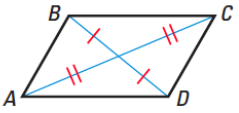


If $\overline{BC} \parallel \overline{AD}$ and $\overline{BC} \cong \overline{AD}$, then $ABCD$ is a parallelogram.

Proof: Ex. 33, p. 528

THEOREM 8.10

If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a parallelogram.



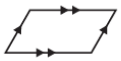
If $\overline{BD}$ and $\overline{AC}$ bisect each other, then $ABCD$ is a parallelogram.

Proof: Ex. 39, p. 529

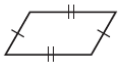
CONCEPT SUMMARY *For Your Notebook*

Ways to Prove a Quadrilateral is a Parallelogram

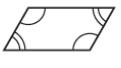
1. Show both pairs of opposite sides are parallel. *(DEFINITION)*



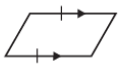
2. Show both pairs of opposite sides are congruent. *(THEOREM 8.7)*



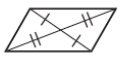
3. Show both pairs of opposite angles are congruent. *(THEOREM 8.8)*



4. Show one pair of opposite sides are congruent and parallel. *(THEOREM 8.9)*

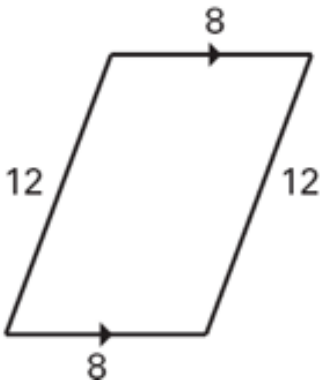


5. Show the diagonals bisect each other. *(THEOREM 8.10)*

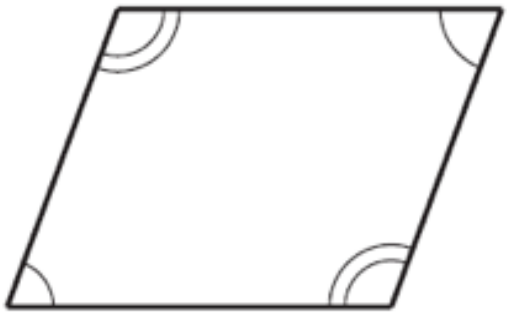


Use Theorem to Prove a Parallelogram

What theorem can you use to show that the quadrilateral is a parallelogram.



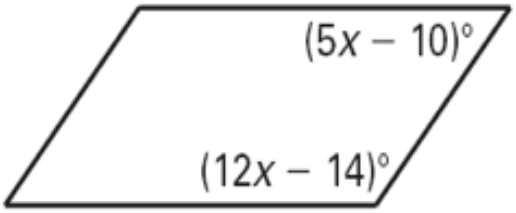
Thm. 8.7
or
Thm 8.9



Thm 8.8

Use Algebra to Prove a Parallelogram

For what value of x is the quadrilateral a parallelogram?

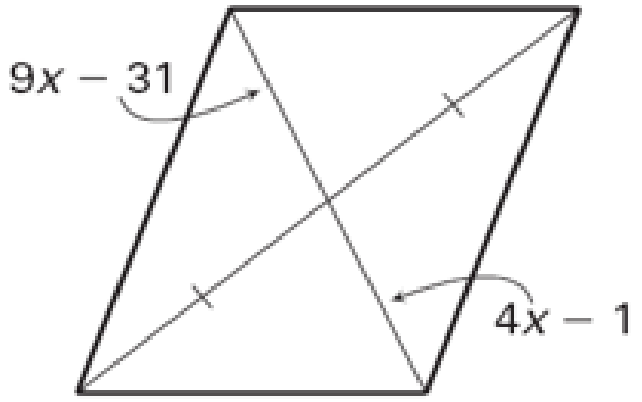


$12x-14+5x-10=180$

$17x-24=180$

$17x=204$

$x=12$



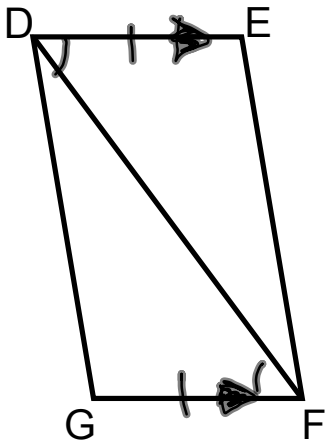
$9x-31=4x-1$

$5x=30$

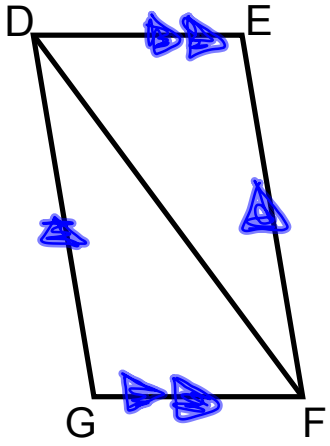
$x=6$

Proving a Parallelogram

Describe how to prove that DEFG is a parallelogram.



1. $\overline{DE} \parallel \overline{FG}$ by Alt. Int. $\angle$'s Converse
2. DEFG is a $\square$ by Thm 8.9



1. $\overline{DE} \parallel \overline{FG}$, $\overline{DG} \parallel \overline{FE}$ by Alt. Int. $\angle$'s Converse
2. DEFG is a $\square$ by the def. of a $\square$

Homework Assignment

Worksheet 8.3B